

ABSTRACT OF THE DISCLOSURE

An instruction virtual address space includes only virtual addresses corresponding to physical addresses of address areas of a physical address space storing pages of only instructions. A data virtual address space includes only virtual addresses corresponding to physical addresses of address areas of the physical address space storing pages of only data. The instruction and data virtual address spaces use duplicated virtual addresses. Instruction and data address translation units translate virtual addresses of the instruction and data virtual address spaces into physical addresses of the single physical address space. A data access efficiency and an instruction execution speed can be improved.

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